No. 126, Original

IN THE SUPREME COURT OF THE UNITED STATES
October Term, 1999

STATE OF KANSAS,

Plaintiff,

vs.

STATE OF NEBRASKA *and* **STATE OF COLORADO,**

Defendants.

COLORADO'S EXCEPTION TO THE FIRST REPORT OF THE SPECIAL MASTER AND BRIEF IN SUPPORT OF EXCEPTION

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COLORADO'S EXCEPTION TO THE FIRST REPORT OF THE SPECIAL MASTER

The State of Colorado respectfully excepts to the Special Master's recommendation that the Republican River Compact restricts a compacting state's consumption of non-alluvial groundwater to the extent the consumption depletes stream flow in the Republican River Basin.

Respectfully submitted,

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STATE OF KANSAS,

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vs.

STATE OF NEBRASKA *and* STATE OF COLORADO,

Defendants.

BRIEF IN SUPPORT OF COLORADO'S EXCEPTION

QUESTIONS PRESENTED FOR REVIEW

1. Does the language of the Republican River Compact unambiguously allocate non-alluvial groundwater?

2. If the Republican River Compact is ambiguous, was it intended to allocate non-alluvial, Ogallala groundwater?

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The State of Colorado submits this brief in support of its exception to the First Report of Special Master Vincent L. McKusick (Subject: Nebraska's Motion to Dismiss) dated January 28, 2000.

JURISDICTION

The original jurisdiction of the Court was invoked by the State of Kansas under Article III, Section 2 of the United States Constitution and 28 U.S.C. § 1251(a)(1).

STATEMENT OF THE CASE

This is an action by the State of Kansas against the State of Nebraska and the State of Colorado concerning the 1943 Republican River Compact ("Compact"), an interstate compact apportioning the waters of the Republican River among the states of Colorado, Kansas, and Nebraska. Kansas alleges that Nebraska's unregulated pumping of groundwater in the Republican River basin violates the Compact. In its answer, Nebraska asserted that the Compact does not apportion groundwater. The Court granted Nebraska leave to file a motion to dismiss to resolve that threshold question of law. Accordingly, Nebraska filed a motion to dismiss, and the Court appointed Vincent L. McKusick as Special Master and referred the motion to him.

In response to Nebraska's motion, Colorado took a position different from either of the other states and *amicus curiae* the United States. Colorado argued that the Compact includes alluvial groundwater,[1] but does not

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[1] As will be discussed in more detail, "alluvial groundwater" refers to groundwater in "the alluvium along the stream channels," the pumping of

extend to non-alluvial Ogallala (also referred to as "table-land") groundwater.[2] Although Colorado is not alleged to be violating the Compact, Colorado voiced the concern that including Ogallala groundwater in Compact computations — something that the Republican River Compact Administration has never attempted to do – would constitute a drastic change in Compact interpretation. Oral argument was held January 4, 2000, in Kansas City, Missouri. The Special Master issued his First Report ("Report") on January 28, 2000.

The Special Master made the following recommendation to the Court:

> The Republican River Compact restricts a compacting State's consumption of groundwater to the extent the consumption depletes stream flow in the Republican River Basin and, therefore, Nebraska's Motion to Dismiss should be denied.

Report at 45.

The recommendation was based on the following four conclusions. First, the language of the Compact unambiguously includes all groundwater that would become part of the stream flow if undepleted by the

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which directly affects surface flows. *See* First Report of Special Master Vincent L. McKusick at 16 (January 28, 2000).

[2] Also discussed in more detail below, "Ogallala groundwater" refers to groundwater in the Ogallala formation, a physically distinct structure underlying parts of eight states and containing billions of acre-feet of ground water. The effect, if any, of pumping Ogallala groundwater on the surface flows of the Republican River and its tributaries was and is still not well understood. *Id.* at 16-17.

activities of man. Second, even if the Compact were ambiguous, the record of Compact negotiations and the Republican River Compact Administration's administration of the Compact show that it was intended to include all groundwater that would become part of the stream flow if undepleted by the activities of man. Third, prior decisions of this Court are consistent with the view that an interstate compact can restrict groundwater use even if the compact does not expressly use the term "groundwater." Fourth, Nebraska violates the Compact if its groundwater pumping, "*whether from alluvial or table-land wells*," depletes stream flow in the basin to the extent that Nebraska exceeds its allocation. Report at 45 (emphasis added).

THE REPUBLICAN RIVER COMPACT

The Republican River Compact was approved by Congress in 1943. Act of May 26, 1943, ch. 104, 57 Stat. 86 (1943). The Compact allocates water in acre-feet for consumptive beneficial use in Colorado, Kansas, and Nebraska, with each state's allocation divided among drainage basins. Compact, Art. IV. (The Compact in its entirety is attached as Appendix A to the Special Master's Report.) The allocations made to each state are derived from the computed average annual virgin water supply originating in thirteen designated drainage basins of the Republican River Basin. Compact, Art. III. The term "Virgin Water Supply" is defined as "the water supply within the Basin undepleted by the activities of man." Compact, Art. II. The "Basin" is defined as "all the area in Colorado, Kansas, and Nebraska, which is naturally drained by the Republican River, and its tributaries, to its junction with the Smoky Hill River in Kansas." A map of the basin is attached to and made part of the Compact.

The Compact also requires that the three states administer the Compact and collect and correlate the data necessary for the proper administration of its provisions. Compact, Art. IX. The United States Geological Survey is directed to collaborate with state officials in the collection, correlation, and publication of water facts necessary for proper administration of the Compact. Compact, Art. IX.

THE OGALLALA AQUIFER

The Ogallala Aquifer is a huge multi-state aquifer that lies beneath an area known as the High Plains Region. Pub. L. 99-662, Title X, § 1121(a)(1), 100 Stat. 4239 (1986). The High Plains Region comprises eight states: Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. *Id.* Only three of these states are parties to the Republican River Compact. The Ogallala formation is a physically distinct underground structure containing billions of acre-feet of groundwater. High Plains Study Council, *A Summary of Results of The Ogallala Aquifer Regional Study, with Recommendations to the Secretary of Commerce and Congress* 3 (December 13, 1982). The amount of water withdrawn from the aquifer each year far exceeds the amount of annual recharge. *Id.* at 4.

SUMMARY OF ARGUMENT

Colorado believes that alluvial groundwater is included in the Republican River Compact and, therefore, agrees with the Special Master's recommendation that the motion to dismiss should be denied. However, Colorado believes that the Special Master erred in applying present day hydrological information to reach the conclusion that

the Compact also allocates groundwater in the Ogallala Aquifer. The language of the Compact, viewed in its historical context, is ambiguous concerning Ogallala groundwater. The extrinsic evidence of Compact negotiations and Compact administration shows that the framers of the Compact believed that pumping from the Ogallala formation did not significantly deplete surface flows in the basin and, therefore, they did not intend to restrict Ogallala pumping.

ARGUMENT

I. THE REPUBLICAN RIVER COMPACT IS AMBIGUOUS CONCERNING THE ALLOCATION OF OGALLALA GROUNDWATER.

Because an interstate compact is both a contract and a statute of the United States and the signatory states, the rules of both contract interpretation and statutory construction apply. *Texas v. New Mexico*, 482 U.S. 124, 128 (1987). If the language of a compact is unambiguous, it is conclusive. *New Jersey v. New York*, 523 U.S. 767, 811 (1998); *Kansas v. Colorado*, 514 U.S. 673, 690 (1995). If the language of a compact is ambiguous, the Court must look to other indicators of the parties' intent, such as the minutes of the compact negotiations and the records of subsequent compact administration. *Oklahoma v. New Mexico*, 501 U.S. 221, 235 n. 5 (1991).

The Republican River Compact does not mention groundwater. It does not refer to groundwater in relation to computing either the virgin water supply of the basin or the state allocations for beneficial consumptive use. The Special Master based his conclusion that the Compact is

unambiguous on the definitions of "virgin water supply" and "basin." Report at 20.

The Special Master noted that one of the Compact's express purposes is "to provide for an equitable division of such waters," and, from that, drew certain inferences about the framers' intent:

> [N]either the parties to the Compact, nor the Congress and the President who approved it, could have intended that an upstream State could, with impunity, unilaterally enlarge its allocation by taking some of the virgin water supply before it reached the stream flow. None of them could have intended that an upstream State could, with impunity, interfere with groundwater discharge that, except for "the activities of man," would augment stream flow in the Basin.

Report at 21.

Colorado has never questioned that those who drafted and approved the Compact intended to allocate both surface water and groundwater in the basin. However, their intent was to restrict the pumping of groundwater with a known, quantifiable effect on basin stream flow – *i.e.*, alluvial groundwater. They did not unambiguously limit development of an aquifer that at the time was believed to have little or no effect on surface flows.

The Special Master found Colorado's contention that the Compact was not intended to include Ogallala groundwater "impossible to square with the Compact's

broad and inclusive definition of 'virgin water supply.'" Report at 43. He reasoned:

> If the drafters were in fact concerned about the difficulty of quantifying the effect of one form of depletion (i.e., table-land groundwater pumping), they could very easily have drafted an exception to the definition of virgin water supply. They did not do so. The absence of any exception shows that the drafters' true concern was to take into account *any* form of depletion – whether by alluvial or table-land pumping or otherwise.

Report at 43 (emphasis in original).

The flaw in the Special Master's reasoning is that it interprets the framers' intent through a present day lens. As discussed *infra* in the section on Compact negotiations, the more logical explanation of the absence of any mention of Ogallala groundwater, when viewed from the framers' perspective more than fifty years ago, is that there was no need to mention a body of groundwater that the states and the federal government believed did not contribute meaningfully to the basin's virgin water supply.

Moreover, even if the Compact's framers believed that there might be some hydraulic connection between the Ogallala Aquifer and the Republican River, they were not capable of determining its extent or, more importantly, of including Ogallala groundwater in calculating the annual consumptive beneficial use of each state. (Given the states' agreement from 1961 to at least 1997 that they could not calculate, even approximately, the effect of pumping by Ogallala wells on the flows of the basin,

discussed *infra* in the section on subsequent Compact administration, it is inconceivable that they thought they could do so in 1943.)[3]

The Compact was intended to remove all causes of present and future controversies and to promote interstate comity. Compact, Art. I. It could not accomplish those purposes if it was impossible to administer because the states could not determine whether they were in compliance. This is not simply a matter of "administrative convenience." Report at 43. It is a matter of administrative *necessity*. The Compact had to be capable of administration from the day it became effective. A Compact that required the states to calculate the effects of Ogallala withdrawals on the virgin water supply of the basin could not have been immediately effective.

An additional indication that the framers did not intend to restrict pumping from the Ogallala formation is the Compact's allocation of beneficial consumptive use based on drainage basins. At oral argument, counsel for the United States stated that, if Ogallala groundwater is included in the basin water supply, there could be wells outside the area delineated in the Compact that affect stream flows in the basin. Oral Arg. Tr. at 73-74.[4] The fact that the Compact

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[3] To illustrate, if a particular Ogallala well pumped 100 acre-feet per year, the states would need to be able to calculate whether that well was depleting annual stream flows by 1/100 of an acre-foot, 1/10 of an acre-foot, 1 acre-foot, 10 acre-feet, or 100 acre-feet. Without being able to make that calculation, the states could not administer the provisions of the Compact, as required by Article IX.

[4] At the September 6, 1996 meeting of the RRCA Engineering Committee, Dick Stenzel of the Colorado Division of Water Resources voiced similar concerns:

> He stated that once you start considering Ogallala wells located outside the alluvial valley fill he did not see

applies only to a delineated area that corresponds to the drainage of the Republican River Basin and that consumptive use is allocated on the basis of drainage basins is consistent with the allocation of alluvial groundwater, but not with the allocation of Ogallala groundwater. Had the parties intended to allocate Ogallala groundwater, they would have limited the consumptive use of all groundwater that contributes to the basin water supply, rather than drawing an arbitrary line that includes only the fraction of Ogallala groundwater underlying the basin.

When the Compact's failure to mention groundwater is considered in the context of the framers' understanding of basin hydrology in the early 1940s, the Compact is ambiguous as to non-alluvial, Ogallala groundwater.

> how you could limit any evaluation of impacts to only wells that cause a specific amount of drawdown or are located at some distance from the alluvial valley fill. He expressed a concern how you would evaluate each state's pumping impacts from Ogallala wells and the possible impacts across state lines. If a state causes stream depletions in another state how would that affect each states [sic] compact allocation? Further how would the compact members evaluate impacts of pumping from the Ogallala by state's [sic] that are not a part [of] the existing Compact that may impact virgin flows?

RRCA, *Report of the Engineering Committee to the Republican River Compact Comm'n for the 1996 Water Year* A-7 (June 5, 1997)(pertinent portion reprinted at Appendix D).

II. THE EXTRINSIC EVIDENCE SHOWS THAT THE COMPACT WAS NOT INTENDED TO ALLOCATE OGALLALA GROUNDWATER.

Although the Special Master concluded that the Compact's language was unambiguous, he nonetheless considered extrinsic evidence of the parties' intent, from which he reached the same erroneous conclusion — that the framers intended to allocate both alluvial and non-alluvial groundwater.

A. The Record of Compact Negotiations Shows that the Framers Intended to Allocate Only Alluvial Groundwater.

The Special Master's Report reviews the records of Compact negotiations which, Colorado agrees, show that the Compact Commissioners intended to allocate groundwater. Report at 25-28. However, these documents do not distinguish among different types of groundwater. The Special Master interpreted this silence as indicative that the framers meant to allocate all groundwater that contributed to the virgin water supply. However, when the records are viewed in a historical perspective, the better inference is that the parties did not intend the Compact to limit pumping from the Ogallala Aquifer.

A critical piece of evidence in ascertaining the parties' intent is the presentation made by Harry P Burleigh of the United States Bureau of Agricultural Economics to the Commission at its fourth meeting and the Commissioners' response. Mr. Burleigh outlined the scope of the work that the Bureau of Agricultural

Economics had been doing throughout the Republican River Basin to determine the extent and usability of groundwater in the basin and presented a tabular statement showing estimated amounts of underground water available in the three states. *Minutes of the Fourth Meeting of the Republican River Compact Commission at Topeka, Kansas* (Jan. 27-28, 1941), 28a of the Brief for the United States as Amicus Curiae in Opposition to the Motion to Dismiss ("United States Brief").

> Mr. Burleigh advised the Commission that he was desirous of obtaining a statement from the Commission as to whether the amounts of underground waters he had determined would be feasibly possible of use, would, in the opinion of the Commission, exceed the allotments of water to each state which the Commission may have agreed upon; that his department did not want to recommend developments of underground water supplies in excess of the allocations of water to each state.
>
> Upon inquiry, Mr. Burleigh advised the Commission that all of the underground waters of the basin above Scandia, Kansas are included in the total water supplies of the basin, as reflected in measurements of stream flow at Scandia and other points in the basin, and that any underground water developments must be considered as reducing to that extent the amount of surface water available for use within the basin.[5]

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[5] The statement that "any underground water developments must be considered as reducing *to that extent* the amount of surface water

Id.

The Special Master found that the Commissioners gave Mr. Burleigh the assurances that he wanted:

> The Commissioners of the three States agreed that Mr. Burleigh's estimated amount of groundwater that might be developed in each of the sub-basins was within the allocations that the Commission had tentatively made, and notified Mr. Burleigh of their agreement. *See* Letter from M.C. Hinderlider, Commissioner from Colorado, to George S. Knapp, Commissioner from Kansas and Wardner G. Scott, Commissioner from Nebraska (Jan. 31, 1941); Letter from George S. Knapp to Harry P. Burleigh (Jan. 30, 1941).

Report at 26 (footnote deleted).

In a subsequent letter to Colorado Governor Ralph L. Carr, Colorado Commissioner Hinderlider stated that the Commission had given *"careful consideration to a*

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available for use within the basin" is additional evidence that Mr. Burleigh and the commissioners were only concerned about alluvial wells. As discussed *infra* in the section on subsequent compact administration, the Republican River Compact Administration's formulas have always "equate[d] alluvial groundwater pumping with direct stream diversions; that is, the consumption of one acre-foot of water pumped from alluvial wells counts as one acre-foot against a State's allocation." Special Master's Report at 16. By contrast, from the start, the Administration recognized that the relationship, if any, between Ogallala diversions and the amount of surface water available is far more complex and indirect. *Id.* at 16-17.

voluminous report of the Bureau of Agricultural Economics of the U.S. Department of Agriculture on the underground water resources of the Republican River Basin " Report at 27 (quoting letter from M.C. Hinderlider to Ralph L. Carr (Mar. 20, 1941)(emphasis added)).[6]

The Burleigh Report is therefore key to understanding the framers' treatment of groundwater.[7] The Burleigh Report divides groundwater into two types:

> It is well known that the effect of recovery of ground water upon the total ground water supply depends upon the physical characteristics of the area or locality. There are two general types of areas. In areas of the first type replenishment or recharge of the ground water reservoir is so slight that withdrawals in any substantial amount will eventually deplete the supply beyond the limits of economic recovery. In areas of the second type the effects of recovery upon the total supply may be offset or balanced by natural recharge.

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[6] All of the letters cited above were lodged with the Court, accompanied by a certifying Affidavit of Douglas R. Littlefield, on September 20, 1999.

[7] In his Report, the Special Master relies on general articles and reports on the hydraulic connection between surface water and groundwater, some of which predate the Compact, Report at 24, and some of which are recent, Report at 2 n. 3. Colorado does not dispute the general principle that surface water and groundwater are often hydraulically connected. However, these authorities shed little light on the parties' understanding of the relationship between the Republican River and the Ogallala Aquifer in the early 1940s. The Burleigh Report is far more relevant for that purpose.

United States Department of Agriculture Bureau of Agricultural Economics, *Water Facilities Area Plan for the Upper Republican Basin in Nebraska, Kansas and Colorado* xxii (1941) ("Burleigh Report"). (The Burleigh report is 177 pages plus appendices. Pertinent portions are reprinted at Appendix A.) The Ogallala Aquifer falls within the first type, whereas alluvial groundwater falls within the second. The Burleigh Report recommended development in the Republican River Basin of the second type of groundwater – alluvial groundwater. *Id.* at xxiv.

The Burleigh Report's general description of groundwater use in the Republican River Basin is revealing:

> Ground Water
>
> There are 128 irrigation wells in the area which irrigate 6,568 acres With an additional 30 wells and with an extension of the land under present wells, practically all of which has been done this year, an additional 3,106 acres will be irrigated in 1941. Maps 11 to 23 in Appendix IV indicate the location of irrigation wells in the alluvial basins. Lands irrigated from wells are mostly located on valley bottoms or on terraces where pumping lifts are relatively low. There are, however, several pumping plants on the uplands. Lifts of the upland plants range from 84 and 215 feet. They have all been installed in the last few years and their operation has been largely experimental.
>
> Water Use. – It is estimated that approximately 16,400 acre-feet of water are

> currently recovered annually for irrigation by means of wells. Since most of the wells are located in the bottom lands and recover water from the alluvial gravels, the source of their supply is surface discharge that is dissipated into the alluvial stream channels. *Those wells on the uplands recover water from the ground water bodies in the Ogallala formation* or in the Pleistocene gravels underlying the loess uplands. In either case the supply is adequate to meet existing demands
>
> *The effect of withdrawal of water from the alluvium will reflect in a diminution of surface water discharge while the effect on the upland area should reflect in the depth to ground water.* In either case the present rate of withdrawal is comparatively insignificant and has not noticeably affected the supply.

Burleigh Report at 70 (emphasis added).

Thus, the report actually relied on by the parties was concerned with the effect of groundwater development in the alluvium, which the Burleigh Report recognized would deplete the virgin water supply of the basin. Pumping from the Ogallala, by contrast, was viewed as affecting the depth to groundwater — *i.e.*, removing groundwater from storage — not as affecting surface flows.[8] The Burleigh Report evidences the intent

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[8] This is not to say that the authors of the Burleigh report were ignorant of possible areas of hydraulic connection between the alluvium and the Ogallala Aquifer. The Burleigh Report states that in some areas "the alluvium is entrenched in the Ogallala formation at a depth great enough that the comingling [sic] Ogallala and alluvial water bodies support the surface stream." Burleigh Report at 42. However, the groundwater

of the Compact's framers to allocate alluvial, but not Ogallala, groundwater.

B. Subsequent Compact Administration Also Shows that the Compact Allocates Only Alluvial Groundwater.

In 1959, Colorado, Kansas, and Nebraska formed the three-member Republican River Compact Administration ("RRCA") to administer the Compact. Each year until 1996, RRCA computed the virgin water supply of each sub-basin and the consumptive use in each state to determine whether each state had stayed within its allocation for the past year. In 1961, RRCA adopted the recommendations of its Committee on Procedure for Computation of Annual Virgin Water Supply that only the wells in the valley floor of the Republican River and its tributaries be considered as depleting the water supply of the Republican River and that a minimum groundwater observation well program and stream gaging stations be established to determine the effect of table-land wells on the flow of the Republican River. RRCA, *First Annual Report for the Year 1960* (Apr. 4, 1961), United States Brief at 88a, 90-91a. RRCA also concurred in the following recommendation of the Committee:

> Apparently the determination of the effect of pumping by "table-land" wells on the flow of the streams in the Republican River Basin must await *considerable more research and data* regarding the character of the

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development contemplated by the report, for which Mr. Burleigh sought and received assurances, was pumping from the alluvium. Potential Ogallala pumping simply was not a concern.

> groundwater aquifer and the behavior of groundwater flow *before even approximate information is available as to the monthly or annual effects on stream flow*. The groundwater representatives of the Geological Survey and the University of Nebraska reported that the effect of pumping of "table-land" wells is not subject to an exact determination and that *it is possible that the table-land wells may not appreciably deplete stream flows*. Recommendation number 4 [for observation wells and gaging stations] is, therefore, for the purpose of observing the trend of the effect of such wells.

Id. at 91a (emphasis added).

The formulas adopted by RRCA in 1961 provide, as a matter of "general procedures": "Irrigation diversions from ground water shall be limited to those by wells pumping from the alluvium along the stream channels." *Id.* at 97a. The formulas treat surface water diversions and alluvial ground water diversions as having the same effect on the virgin water supply; for both types of diversions, diversions minus return flows are added to the recorded stream discharges. *Id.* at 100a-102a. The "general procedures" also substantially repeat the above-quoted language on the lack of knowledge about the effect of pumping by table-land wells. *Id.* at 97a. From 1961 to 1990, RRCA's annual reports contained similar language. Special Master's Report at 32; United States Brief at 108a. The formulas continued to treat the effects of diversions by alluvial wells on surface flows the same as the effects of surface diversions: *i.e.*, diversions minus return flows. United States Brief at 110a-114a

For each year from 1961 through 1995, RRCA's calculations of consumptive use included groundwater pumping from the alluvium only. RRCA, *Report of the Engineering Committee to the Republican River Compact Comm'n for the 1994 Water Year* Ex. 3-1 (June 8, 1995) (pertinent portion reprinted at Appendix B). From 1996 on, because of the states' disagreement about the inclusion of groundwater in the Compact, the annual reports have not included computations of virgin water supply and consumptive use. RRCA, *Report of the Engineering Committee to the Republican River Compact Comm'n for the 1995 Water Year* 14 (June 6, 1996) (pertinent portions reprinted at Appendix C). The effect, if any, of Ogallala well pumping on the surface flow of the Republican River or its tributaries has *never* been calculated by RRCA. Special Master's Report at 17. Instead, as recently as 1996, the Engineering Committee agreed that the Ogallala Aquifer is very heterogeneous, making it difficult to generalize about impacts of pumping from the Ogallala formation on the renewable water supplies of the basin. *Report of the Engineering Committee to the Republican River Compact Comm'n for the 1995 Water Year* at 16. The Engineering Committee also agreed that "to fully define the impact of pumping of Ogallala Aquifer on the water supply of the basin would require detailed computer modeling." RRCA, *Report of the Engineering Committee to the Republican River Compact Comm'n for the 1996 Water Year* A-7 (June 5, 1997) (pertinent portions reprinted at Appendix D).

Notwithstanding RRCA's deliberate and explicit decision spanning more than thirty years to exclude Ogallala well pumping from its consumptive use calculations, the Special Master found that "[f]rom the

outset, the RRCA has, by its unanimous action, construed the Compact to restrict any kind of groundwater pumping by a compacting State to the extent it depletes stream flow in the Basin." Report at 32:

> The RRCA immediately applied that general principle to alluvial groundwater pumping and deferred applying it to table-land groundwater pumping only because of the need to obtain further data to quantify the effect of the table-land pumping on Basin stream flow.
>
> * * * * *
>
> The RRCA, through its call for "more research and data" to quantify the hydraulic connection between table-land pumping and stream flow, has repeatedly indicated its intention later to include the effect of table-land groundwater pumping in the Formulas.

Report at 32, 34.

The Special Master's conclusion that RRCA has construed the Compact to restrict Ogallala pumping is belied by RRCA's actual course of conduct. Since 1961, RRCA has administered the Compact by calculating and allocating the beneficial use of *only* alluvial groundwater. To interpret that long-standing practice as "construe[ing] the Compact to restrict any kind of groundwater pumping " turns the record on its head. Moreover, it requires one to assume that the three states knowingly failed to carry out their duty under Article IX to administer the Compact for more than thirty years.

RRCA's call for more research and data is not inconsistent with its practical interpretation of the Compact as limited to alluvial groundwater. Rather than supposing that RRCA intended at some unknown point in the future to amend its formulas to include Ogallala groundwater, it is reasonable to assume that, if research and data were ever to indicate a need to restrict pumping from the Ogallala to protect the basin water supply, the states would consider amending the Compact, or even negotiating a new compact specific to the Ogallala, which might require involving one or more of the other High Plains states. The better interpretation of more than thirty years of Compact administration by the three states is that they recognized that the Compact did not allocate any Ogallala groundwater, but were prepared to consider recommending a *new* allocation of Ogallala groundwater if it were ever proved necessary.

Moreover, looking backward from Compact administration to Compact formation, the Compact's framers would have had to intend to restrict well pumping from the Ogallala Aquifer in spite of the fact that twenty years later – and even fifty years later — RRCA would find that not even approximate information was available as to the effects of Ogallala pumping on stream flow. In the 1940s, the hydraulic connection between surface flows and alluvial groundwater was well understood. But to believe that the Compact restricts pumping from the Ogallala Aquifer, one has to believe that the framers sought to allocate a resource that they knew they did not understand — that they intended to enter into a compact that was open- ended in defining the rights and obligations of the states.

A compact is a contract, not a constitution; it is

intended to create fixed, defined rights and responsibilities, not to subject the parties to unknown obligations and uncertain liability as times change.

CONCLUSION

In interpreting the Republican River Compact, the framers' intent must be determined by reading the document in the context of the 1940s. Even today, we do not fully understand the hydraulic relationship between the Ogallala Aquifer and the surface flows of the Republican River. However, what we know now is irrelevant. What matters is what those who drafted and approved the Compact knew and intended at the time. When the Compact is construed from the vantage point of its framers, the more reasonable interpretation is that the Compact allocates only alluvial groundwater. The Court should not change the rules more than fifty years after the Compact was signed and approved.

DATED THIS 7th day of April 2000.

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APPENDIX A

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS

WATER FACILITIES

AREA PLAN FOR

UPPER REPUBLICAN BASIN

IN NEBRASKA, KANSAS AND COLORADO

WATER UTILIZATION SECTION
DIVISION OF LAND ECONOMICS

Under the Provisions of the
Water Facilities Act
(Public Law No. 399, 75th Congress)

June 1941

RECOMMENDATIONS

Water Use

The development of ground water for pump irrigation involves the use of a resource about which it is frequently impossible to obtain detailed and complete information. Ordinarily, the amount of available supply and the rate of replenishment cannot be accurately ascertained without first initiating development and observing the subsequent behavior of the water table. In the absence of exact data resulting from actual experience, technicians frequently estimate with considerable accuracy the approximate behavior of ground water supplies when subjected to development. Such forecasts of probable effects on total water supply serve as a valuable guide in indicating a safe or reasonable rate of development, which, in turn, may determine the advisability of investment in well-irrigation works.

It is well known that the effect of recovery of ground water upon the total ground water supply depends upon the physical characteristics of the area or locality. There are two general types of areas. In the areas of the first type replenishment or recharge of the ground water reservoir is so slight that withdrawals in any substantial amount will eventually deplete the supply beyond the limits of economic recovery. In areas of the second type the effects of recovery upon the total supply may be offset or balanced by natural recharge. Because this balance between withdrawals and recharge, so to speak, is a possibility and not a certainty, areas of the second type of may be divided into two classes: first, those areas where natural factors such as non-irrigability of soils or condition of the stream bed tend to

limit the amount of recovery; and, second, those areas where no natural factors tend to prevent depletion of the supply.

The ground water recovered in areas of the first type is usually "historical" water, that is, water that has existed beneath the surface since past geologic periods but which, because of changed geologic and topographic conditions, may no longer be replenished from the sources that created the supply originally. The rate of recharge from precipitation is extremely small in relation to the total supply. The recovery of ground water in appreciable amounts in an area of this type can only result in lowering the water table beyond the point of economical pumping. The feasibility of development in such an area depends largely upon the time element. Clearly, no development could be considered economically feasible if depletion beyond economic recovery would result before investors had realized profitable returns on their investments. Since there is no substantial recharge to the ground water reservoirs, this eventual depletion cannot be prevented by administrative control of the rate of recovery. Such control, by statutory authority or otherwise, however, could regulate the rate of depletion in accordance with a planned long-time water use most beneficial to the community. Development of such areas with private or public money appears to be advisable only to the extent that administrative controls can afford adequate protection of investors.

As indicated, areas of the second type are characterized by the possibility of recharge sufficient to replace the amount of water withdrawn. An example of this type is that of a stream valley, a considerable portion of the floor of which is filled with a porous permeable alluvium. Since the recovery of ground water lowers the water table, the resulting drained interstitial spaces in the alluvium serve as additional

reservoir capacity for increased ground water storage of percolating surface water. Where surface waters find their way underground in this manner, the limit of ground water recovery may be roughly measured by the amount of the surface discharge of the overlying stream in combination with estimates of the extent of replenishment to the alluvium. Where surface water is discharging unused and unclaimed from an area or basin and, hence, is available for storage in the drained alluvium, it follows that opportunity exists for ground water development.

Even though there may be a known recharge, development of ground water in areas of this type should be a gradual process embracing a long period, and its growth should be governed by and integrated with the long-time good of the basin as well as the desires of individual agricultural operators. This gradual rate of development is essential to the careful and deliberate evaluation of the effect of recovery upon the groundwater supply. Unfortunately, potential investors do not always have assurance that proposed development will be a gradual and conservative process designed to strike a balance between recovery and recharge. Since natural factors sometimes tend to promote the maintenance of such a balance, areas of the type here considered may be grouped, as previously indicated, into two classes depending upon the existence or absence of such physical limitations upon the rate and amount of groundwater withdrawal.

Development of areas of the first class appears feasible to the extent that the natural facts will tend to curb over-development leading to depletion of the supply. Investment in pump irrigation where there is an excess of available water over irrigable land by reason of the isolation of such land by topographic conditions would seem to be a sound

undertaking. Development of ground water in areas of the second class where nothing exists to retard depleting the supply by withdrawals far in excess of replenishment is obviously hazardous. Development under such circumstances should be undertaken only if there is some form of administrative authority that can be exercised to limit development so as to protect the individual investors and the community economy. The value of public administration of this sort has been recognized in a number of states in connection with the development of artesian waters, but it has only limited recognition in the case of ground waters in general. Administrative control by statutory authority would be desirable, of course, even in those areas where natural characteristics tend to limit the amount of development because such administrative control is adaptable to varying conditions and hence admits closer control than natural conditions provide. It is further desirable because legislation establishing administrative authority usually provides for the making of hydrographic and other surveys and for the accumulation and analysis of data on the effect of ground-water withdrawal.

Recommendations are made for developments in the Upper Republican Basin because a detailed study indicates that many portions of that basin are Type 2, Class 1 areas, to use the classification described in the foregoing. That is, they are areas of the second type because ground water may be replenished by recharge to the alluvium, and they are within the first class of the second type because natural conditions tend generally to prevent excessive withdrawals. Since the available surface water supply in the basin is known to be considerably in excess of existing and proposed water use and since the rate at which these surface waters will find storage in the drained alluvium appears to be relatively rapid, it seems evident that ground water is

available for development. Over-development, generally inevitable where no controls over withdrawals exist, does not appear to be a hazard in view of the following limiting factor: in much of the basin the localities where irrigable lands occur in conjunction with readily recoverable ground water are usually scattered over long reaches or are isolated by non-irrigable areas. Accordingly, it seems reasonable to initiate development in the basin at a conservative rate.

The importance of developing ground-water resources as a gradual process has already been noted. It is especially important here because the consumptive uses of waters withdrawn from the alluvial valleys of the basin will constitute a depletion of surface discharge since a considerable increase in contribution to the alluvial ground waters from surface streams can be anticipated as a result of a lowering water table. It appears reasonably certain, however, that development at the rate recommended herein will not so deplete surface discharge as to interfere with the established rights of surface water users. The limits of allowable draft here recommended are purposely conservative because the exact rate of ground water replenishment in the basin is not known. While believed to be consistent with available data relating to recharge, the recommended withdrawals are necessarily tentative until further operational experience furnishes additional data.

The fact that developments are recommended for the Upper Republican Basin does not mean that the entire basin is considered suitable for development. The physical conditions governing the relation between pumping rates and water supply vary widely in the various component sub-basins. The area plan has been developed with full recognition of the fact that ground-water supplies, because of the varying physical conditions under which they occur,

cannot reasonably be developed according to a uniform method under uniform standards. Each case must be decided on its own merits. In making recommendations it has been recognized that where the available supply is believed or known to be limited and the rate of replenishment relatively slow no development should be initiated in the absence of effective legal or natural means to control the rate and amount of development. If experience is a guide to the future, such uncontrolled development would cause a serious depletion of the ground-water resources which would result in investment losses and an adverse influence on the standard of living in the area. The absence of effective administrative control over the withdrawals of ground water in Colorado, Kansas, and Nebraska, as pointed out in the legal analysis, does not necessarily preclude all development; however, lack of such control has necessitated limiting consideration to those areas having some kind of natural control over withdrawals.

In view of the foregoing, the following recommendations are made for development in the Upper Republican Basin:

1. Irrigation by recovery of ground water from alluvial stream channels is recommended for approximately 125, 000 acres of land located along the main Republican River and its tributary systems, as follows:

Main Stem of Republican River	70,997 acres
North Fork Republican River	none
South Fork Republican River	4,580 acres
Arikaree River	4,400 acres
Frenchman Creek	9,000 acres
Blackwood Creek	none
Red Willow Creek	none

Medicine Creek		12,279 acres
Deer Creek		1,200 acres
Beaver Creek	-	12,299 acres
Sappa Creek		5,230 acres
Prairie Dog Creek		4,950 acres

2. As the recommended rate of withdrawal is approached, it is further recommended that careful consideration be given to establishment of percolation beds in order to increase the rate of ground water replenishment should observation of water table behavior indicate that pumping at rates higher than herein recommended will require higher rates of recharge.

3. It is urged that there be close observance of the recommendations delineating irrigable and non-irrigable lands in order to preclude the possibilities of local over-development, and to confine the investment required to the lands which are most productive and most easily managed, thereby giving opportunity for a larger return on the investment.

4. It is recommended in all cases, whatever the source of supply or type of diversion, that the potential water user file with the appropriate state officer or board an application to appropriate water or a notice of use of water, whether such notice be required by statute or not. The establishment of beneficial use of water as an official record is a matter of general protection to the water user. In Colorado the authority of the State Engineer extends only to adjudicated water rights. Since the statute makes provision for immediate adjudication of rights, the water user should seek a prompt adjudication. This procedure must be initiated by him, but departmental agencies should advise the water user

both with respect to filing a notice of use and securing adjudication.

5. In the western portion of the Republican Basin where rainfall is low and where irrigation may be profitably practiced every year it is certain that irrigators can afford greater annual water costs than can or will be met in the eastern part of the basin where irrigation is likely to be more definitely supplemental in character and, in fact, unnecessary in some years of highly favorable precipitation.

6. In the eastern portion of the basin the use of rehabilitated pumping and power equipment in the installation of pumping plants is recommended. Such an arrangement results in higher operation costs but enables the irrigator to benefit from greatly reduced fixed charges in the years when irrigation will be unnecessary. This type of installation is not recommended where the total annual recovery will generally exceed 150 acre-feet.

7. In several of the component basins of the Republican River Watershed, data relating to the porosity and permeability of alluvial sands and gravel are unavailable and, hence, it is recommended that proof of these influencing factors be obtained by drilling test prior to installation of irrigation facilities. Test drilling (not experimental wells) will be particularly necessary in the alluvial basins of the lower South Fork Republican, the central portions of Beaver and Sappa Creeks basins and the central and lower sections of Prairie Dog Creek.

8. Water spreading systems for flood water irrigation of pasture or grasslands are recommended for development on the headwater areas of the Arikaree River, the South Fork

Republican and other small localized areas where topography and available water supplies will permit.

9. In the case of many individual farmers small water facilities for garden irrigation can be of almost inestimable value, and such facilities are recommended for consideration and possible installation as a part of the development on individual farms.

10. The development of surface water facilities for furnishing livestock and farmstead water is recommended in those portions of the Republican Basin where ground waters are not available or are inadequate for those purposes. Such areas are indicated on Map 26 and are discussed in the text.

Land Use

* * * * *

Water Supply of Subareas within the Component Basins

The recommendations made later in this plan are of necessity dependent upon the known or estimable quantities of water supply available within subareas where irrigable land may be utilized. Varying hydrologic and geologic conditions affect not only the amount and occurrence of water supply, but the potential utilization of such supply. Within the Republican Basin, four different typical geologic cases occur which vitally influence the occurrence and use of water supply and, consequently, each of the component basins is divided into subareas within which hydrologic factors are comparable. The four typical conditions are (1) where the alluvial valley fill is encased by the Ogallala formation but lies high above the ground water body of that formation, (2) where the alluvium is entrenched in the

Ogallala formation at a depth great enough that the comingling Ogallala and alluvial water bodies support the surface stream, (3) where the stream valley alluvium is encased in virtually impervious shale and the surface stream is supported by the ground water table of the alluvium, and (4) where the alluvial valley is encased by shale on one side of the basin and by water bearing gravels on the opposite side of the valley (Chart I).

The division of the component basins into subareas, the type of each subarea, the drainage area of each subarea and the recorded or estimated surface water supply which occurs in each subarea are all shown in Table 31 and illustrated on Map 25.

Ground Water Supply

The portion of the Republican Basin herein discussed has large quantities of potable ground water available for recovery and use. Several small areas wherein impervious shales form or are very near the land surface have no ground water readily available. Map 26 illustrates graphically the general availability of ground waters throughout the area.

Most ground water in the basin originates from that portion of the precipitation which escapes transpiration, evaporation and surface run-off to percolate downward and join the ground water body. However, a considerable quantity of ground water percolates southward from the Platte River into the Republican Basin. The leakage occurs through the thick Pleistocene gravel formations (Holdrege and Grand Island Formations; see "Geology") where these formations interconnect between the two rivers. The greater percentage of this leakage probably occurs east of the western border of Dawson County, Nebraska. Ground

waters that are available for economic recovery exist largely in a state of transient storage in the Ogallala formation, in the alluvial fill along the bottom lands of the various streams (see "Geology"), and in the Pleistocene gravel formations.

In order to define existing ground water resources more clearly, the basin has been subdivided into four provinces (see Map 26). Each area presents certain characteristics of more or less uniformity that determine the presence and possibility of ground water recovery.

Province I is delineated as that area along the major stream courses where the alluvium is often of sufficient thickness and permeability to supply water for irrigation wells. Detail of the alluvial channels and bottom lands is shown on Maps 11 and 23 in Appendix IV The thickness and permeability of the alluvium will be discussed later under the hydrologic conditions existing in each country.

The underflow of the Republican River and its major tributaries follows, in general, the course of the streams. Since underflow in the alluvium is subject to constant recharge by surface flow there is no great danger of exhausting this source of water supply if an orderly, planned, irrigation development procedure is followed.

Province II is the portion of the area wherein sand dunes of Recent age form the land surface. The dune sands are largely derived from the Tertiary deposits by aeolian reassortment. Precipitation falling on this province either percolates to the water table or is lost through transpiration and evaporation. There is little surface run-off from this province and the percentage of rainfall that becomes ground water is high. An abundance of ground water is available in the sand dune area at relatively shallow depths. However,

the land slopes and soils are such that only extremely small acreages can be irrigated successfully. Springs and seeps along the southern and eastern edges of Province II are numerous.

Province III constitutes the High Plains area of the Republican River Basin. In this province the Tertiary and Pleistocene sediments yield large supplies of water of good quality. The rocks of the province supply water to most of the farmsteads, municipalities, railroads, and industries in this watershed. Because of the high lift ordinarily encountered, few irrigation wells tap Tertiary deposits of this province for water. There are, however, a few shallow water areas where the static water level does not exceed 70 feet that could be exploited for irrigation water. These shallow ground water areas are discussed under the hydrologic conditions which occur in each county.

Province IV is that portion of the Republican River watershed where reliance must be placed on surface storage for water for stock and farmstead use. The wells in the province generally yield only meager supplies of rather highly mineralized water, usually unfit for stock or domestic consumption, and dry holes are not uncommon. Cretaceous shales and chalks are at or very near the surface in this province and ground water is scant in quantity and poor in quality.

For ease of presentation and discussion, the following paragraphs briefly discuss availability of ground water, by States and counties, in the basin.

* * * * *

Ground Water

There are 128 irrigation wells in the area which irrigate 6,568 acres (see Table 33). With an additional 30 wells and with an extension of the land under present wells, practically all of which has been done this year, an additional 3,106 acres will be irrigated in 1941. Maps 11 to 23 in Appendix IV indicate the location of irrigation wells in the alluvial basins. Lands irrigated from wells are mostly located on valley bottoms or on terraces where pumping lifts are relatively low. There are, however, several pumping plants on the uplands. Lifts of the upland plants range between 84 and 215 feet. They have all been installed in the last few years and their operation has been largely experimental.

Water Use. – It is estimated that approximately 16,400 acre-feet of water are currently recovered annually for irrigation by means of wells. Since most of the wells are located in the bottom lands and recover water from the alluvial gravels, the source of their supply is surface discharge that is dissipated into the alluvial stream channels. Those wells on the uplands recover water from the ground water bodies in the Ogallala formation or in the Pleistocene gravels underlying the loess uplands. In either case the supply is adequate to meet existing demands. The specific capacity varies widely in various wells as a result of wide variance in the permeability of the aquifers and methods of well installation. Table 47, Appendix III, illustrates variation in well performance.

The effect of withdrawal of water from the alluvium will reflect in a diminution of surface water discharge while the effect on the upland area should reflect in the depth to ground water. In either case, the present rate of withdrawal

is comparatively insignificant and has not noticeably affected the supply.

* * * * *

APPENDIX B

REPUBLICAN RIVER COMPACT ADMINISTRATION

THIRTY-FIFTH ANNUAL REPORT

FOR THE YEAR 1994

Lincoln, Nebraska

June 8, 1995

(Includes Special Meeting Minutes for September 28, 1994 and January 19, 1995 meetings)

REPORT OF THE ENGINEERING COMMITTEE TO THE REPUBLICAN RIVER COMPACT COMMISSION FOR THE 1994 WATER YEAR

At the annual meeting on June 9, 1994 the Engineering Committee was requested 1) to make the appropriate calculations related to virgin water supplies and allocations, recognizing that there were concerns with the computations and 2) to review the U. S. Army Corps of Engineer's Harlan County study and, if they felt comments on the report were necessary, provide their recommendations to the Compact Commissioners.

The Engineering computed the virgin water supplies and consumptive uses for water year 1994 in accordance with the procedures outlined in Republican Compact Administration Formulas for the Computation of Annual Virgin Water Supply and Consumptive Use, Revised June 1990. The resulting computations are shown in Tables 1 and 2.

The U. S. Army Corps of Engineer's Harlan County Study is not yet complete. Therefore the Engineering Committee has nothing to report.

At the special meeting of the Compact Commission January 19, 1995 the Engineering Committee was requested to 1) determine what water supplies were used to calculate the virgin water supplies listed in the compact; 2) review the 1987 Republican River Compact Engineering Committee Report and 3) make recommendations on what should be included in computations today. The Engineering Committee met February 22, 1995 to carry out these special assignments. The resulting report is included as an attachment to this report.

Alan Berryman
Colorado

David Barfield
Kansas

Ann Salomon Bleed
Nebraska

Leif Holliday
Kansas

Michael Thompson
Nebraska

APPENDIX C

REPUBLICAN RIVER COMPACT ADMINISTRATION

THIRTY-SIXTH ANNUAL REPORT

FOR THE YEAR 1995

Cambridge, Nebraska

June 6, 1996

REPORT OF THE ENGINEERING COMMITTEE TO THE REPUBLICAN RIVER COMPACT COMMISSION FOR THE 1995 WATER YEAR

The Engineering Committee for the Republican River Compact Commission met May 7, 1996 in Lincoln, Nebraska. Attending the meeting were David Barfield from Kansas; Richard Stenzel and William McIntyre from Colorado; and Michael Thompson, Russell Oaklund and Ann Bleed from Nebraska.

Agenda

At the annual meeting on June 8, 1995 the Engineering Committee was requested to: 1) Calculate the virgin water supply and consumptive use in accordance with the compact formulae; 2) Review the Bureau of Reclamation's Regression Equations for Modeling Harlan County Reservoir as published in "Republican River Basin Flows, Flows Adjusted to 1993 Level of Basin Development" by Lane, Norval and Weghorst, U.S. Department of Interior Bureau of Reclamation, October 1995; 3) Review the ground water studies of the Republican River Basin; and 4) Review and recommend options for maintaining gaging stations used by the Republican River Compact but not operated by the U. S. Geological Survey. In addition to the four above committee assignments, three additional items were added to the agenda by Barfield; 5) Review and discuss the methodology used by each state to determine ground water consumptive use; 6) Determine whether the virgin water supply and allocations needed to be adjusted every year; and 7) a Determine whether flood flows should be included in the calculation of the virgin water supply. A review of how each state calculated consumptive use was added because Nebraska has more precisely delineated the boundaries of the alluvial

aquifer in Nebraska, has revised its methodology of determining the number of acres irrigated by ground water wells and, for the area in the Upper Republican Natural Resources District, has started using actual pumpage data instead of estimates based on irrigation requirements.

Computation of the 1995 Virgin Water Supply and Consumptive Use

Due to concerns raised during the course of the Engineering Committee meeting, as well as subsequent to it, the numbers prepared were not endorsed by the full committee and are therefore not included in this report.

* * * * *

Review of Ground Water Studies of the Republican River Basin

The Engineering Committee focused on the three most recent modeling studies of the basin. We looked at the studies to see what they could tell us about the stream flows and the impact of pumping from the Ogallala formations on the renewable water supplies in the Republican River. The studies described ground water models that were calibrated to mimic the changes in ground water levels and stream flows for the area between the Platte River basin on the north and the Republican River basin on the south (Figure 1). A brief summary of each study is presented in Appendix A.

All studies used the calibrated models to predict the impacts of continued ground water development. The results indicated there were and would continue to be water level declines in the ground water formations between the Platte River and the Republican River and declines in the outflows

to the surface water system of the Republican River basin. Other useful information in these reports included geological descriptions of the area and documentation of historical water level increases and declines. Most of the increases occurred in the Platte River basin. Ground water levels and stream flows were shown to have declined in many areas in the Republican River Basin. Perennial reaches of tributary stream have also shortened in the western part of the basin.

The committee concluded that the studies and models were useful for looking at ground water level and stream flow changes that have or could occur in the area.

It should be noted however that the predicted declines in the oldest of the studies, on the middle Republican area, have not occurred. Barfield also observed that in the past the Compact Commissioners have excluded the Ogallala because its impact on the virgin water supply could not be quantified. These studies do not give a quantification of the impact of the Ogallala, but the models do have node points that indicate the present day level of depletions to stream flows caused by the pumping of the regional aquifers.

In all the studies the Republican River is treated as a boundary for the model. Because the models are constrained along the boundaries, the accuracy of the model in predicting water levels along the Republican River is a function of the modeling assumptions. In addition all the studies describe the Ogallala aquifer in the region as very heterogeneous. The degree to which the Ogallala is cemented varies greatly from place to place and this significantly affects the rate of water movement to the saturated zone. Furthermore, its saturated thickness differs greatly because of the incision of streams tributary to the Republican River. Therefore, it will be difficult to generalize about impacts of pumping in the

Ogallala formations on the renewable water supplies of the basin. The Committee concluded that to improve understanding on impact of pumping in the Ogallala formations on the main stem Republican River, a model that extended the model boundary further to the south and did not treat the Republican River as a model boundary condition could be developed.

Barfield also reported that the Kansas' Sub-basin Water Resources Management Team is considering the construction of models on Prairie Dog, Sappa and Beaver Creeks in the near future.

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APPENDIX D

REPUBLICAN RIVER COMPACT ADMINISTRATION

THIRTY-SEVENTH ANNUAL REPORT

FOR THE YEAR 1996

Burlington, Colorado

June 5, 1997

Appendix A

Summary
Report of the Engineering Committee For the Republican River Compact Commission Special Project Concerning Standard Consumptive Use Methods and Standard Method of Determining Which Wells Should be Included in Compact Calculations.

The Engineering Committee for the Republican River Compact Commission met on July 11, August 6, and September 6, 1996 in McCook, Nebraska. Attending all of the meetings were David Barfield and Scott Ross from Kansas DWR; Ann Bleed, Michael Thompson, and Russell Oaklund from Nebraska DWR; and Dick Stenzel from Colorado DWR. Leif Holliday of Kansas DWR attended the August 6th and September 6th meetings. Bill McIntyre from Colorado DWR attended the July 11th meeting while Chuck Roberts of the Colorado DWR attended the August 6th and September 6th meeting. Also in attendance at all of the meetings were John Thorburn of the Tri Basin NRD; Ron Wunibald of the Lower Republican NRD; and Ronald Milner of the Upper Republican River NRD. The Middle Republican NRD was represented by Wayne Heathers at the July 11th and August 6th while Dan Smith attended the September 6th meeting. On August 6th James Goeke and Vince Dreezen of UNI-CSD, and Ben Saunders and Gene Bauerle of Colorado groundwater management districts were also in attendance. The Engineering Committee also held two telephone conference calls on April 14th, 1997 to discuss the final recommendations to the Republican River Commissioners and to agree on what issues remain unresolved.

Agenda

At the Annual Meeting on June 6th, 1996 the Engineering Committee was requested by the Republican River Commissioners to: 1) Define what is to be considered as an alluvial well and thus considered as part of the Compact calculations in each state; and 2) Develop a standard method that will be used by all three states to calculate the consumptive use for wells that do not have a meter or don't report the amounts pumped. The recommendations of the Engineering Committee were to be made by the end of October 1996 and the Commissioners then would act on the proposals by the end of the year. After the Commissioners approve the recommendations of the Engineering Committee the 1995 report on virgin water supply and consumptive use will be finalized.

* * * * *

September 6th Engineering Committee Meeting:

Each state discussed what they felt were the pros and cons of using the Kansas methodology as outlined in Attachment A. Roberts reported that if we were to use the procedure proposed by Kansas that it would result in 33 additional wells being considered as compact wells in Colorado. Stenzel stated that he was concerned about whether the process being proposed by Kansas was permanent and subject to further revisions. He also questioned the basis for the one half foot decline limit for wells located in the Ogallala outside the alluvial valley fill. The reason behind looking only at a single year's pumping impact or not considering the impact of multiple wells pumping on the alluvial aquifer was also questioned. He stated that once you start considering Ogallala wells located outside the alluvial valley fill he did not see how you could limit any evaluation

of impacts to only wells that cause a specific amount of drawdown or are located at some distance from the alluvial valley fill. He expressed a concern how you would evaluate each state's pumping impacts from Ogallala wells and the possible impacts across state lines. If a state causes stream depletions in another state how would that affect each states compact allocation? Further how would the compact member evaluate impacts of pumping from the Ogallala by state's that are not a part the existing Compact that may impact virgin flows?

Bleed had the same concerns as Stenzel. In addition she stated that she could live with the assumption that all alluvial well pumping affected the virgin flows during the year the wells were pumped; however, she questioned the assumption being used for the Ogallala wells. This would be especially true if the assumptions are further extended in the future to include the Ogallala wells that are located at greater distances than those that would be included using the existing Kansas methodology. Bleed stated she felt that the farther a well is from the stream the less likely 100% of what is pumped will result in a depletion to the stream. Thorburn also expressed concern that including Ogallala wells would start the process down a very slippery slope.

Barfield reaffirmed what he felt were the advantages of the Kansas methodology, as noted in attachment "A"; he also stated that he felt that the existing method was only a first step and that there may need to be additional wells added in the future. He understood the concern about future modifications but those issues would have to be addressed when that time came. He stated that he had difficulty with Nebraska's methodology of defining the alluvium on tributaries to the Republican River. Kansas stated that they did not believe Nebraska's changes in 1995 were a step

forward, particularly in the Frenchman basin. Kansas stated it was extremely difficulty to review Nebraska's changes without a map of the valley fill aquifer. Kansas and Colorado suggested that until Nebraska could produce an acceptable map for review, the 1994 well listing be used. Bleed stated the alluvial wells were identified by Dreeszen based upon the drillers logs for each well and soils and topographic information from USGS maps. This information was made available to Kansas in Lincoln. She asked what other information would Kansas want to see in order to evaluate Nebraska's determination? She also asked Kansas to provide an explicit operational definition of how to determine the alluvial-fill boundary.

The Engineering Committee agreed that to fully define the impact of pumping of Ogallala Aquifer on the water supply of the basin would require detailed computer modeling. Kansas believes their proposal defines well pumping which has a direct annual impact on the surface water alluvial system and thus could be justified without such modeling. The other members questioned whether the additional wells, using the Kansas method, had any less impact than the remainder of wells in the Ogallala aquifer. Kansas stated that the adoption of the Kansas proposed methodology does not fully address the Ogallala pumping impacts to the surface system.

The members of the Engineering Committee agree that there is potential and probable depletion to compact virgin flows caused by wells outside the alluvium. The engineering representative for Kansas has submitted Attachment "A" as the procedure to be used to determine which wells shall be considered as pumping from the alluvium for compact purposes. Barfield suggested that if this procedure is adopted in its entirety by the Compact Commissioners then

the 1995 virgin flow study should be modified using information provided by each state using this procedure. Colorado and Nebraska recommended that only wells described in Attachment "B" shall be considered as pumping from the alluvium for compact purposes.

The Engineering Committee discussed what steps the NRD's would need to take for the committee to accept voluntary meter readings and survey results. The Lower and Middle Republican NRD's each submitted a proposed meter policy that dealt with verification of flow meter data that would be used to report well pumping in their NRD's in the future. Following a discussion regarding the proposal and the concerns of David Barfield it was agreed that with the revisions suggested by David that the NRD's would resubmit their proposal for approval of the Committee. The two NRD's agreed to redraft a single proposal which is attached hereto as attachment "C"

Kansas raised the broader issue of verifying the questionnaire information on irrigated acres. Kansas suggested that in the future, along with their survey, the NRD's request the landowners to submit third-party verification of acres irrigated, possibly using FSA maps, or that the NRD's work with FSA directly. Colorado supported the Kansas position that reduction in acreage from authorized acreage would require some type of verification on the part of the NRD's.

In regard to verifying the 1995 acreage reduction based on the NRD's surveys, Kansas suggested that the verification of at least a portion of these reports would be needed. Kansas suggested that the NRD's target the top 25% acreage reduction resulting from the survey for verification. Kansas agreed to review the NRD data and make a recommendation

for the Commissioner's consideration concerning what percentage should be sampled and what form that should take, Attachment "D" is Barfield's letter of November 26, 1996 to Mr. Wayne Heathers with his suggestions in this regard.

The Engineering Committee will ask if the Commissioners want to assign the Committee the responsibility to draft a minimum set of guidelines for meter readings and submittals from the well owners that will be used by all the member states and ask for any further guidance the Commissioners may provide regarding the scope of the assignment. It was also decided that procedures for the verification of data submitted in regards to irrigated acreage should only be developed if that is the desire of the Commissioners and to determine what the Commissioners want as to the scope of any such procedure.